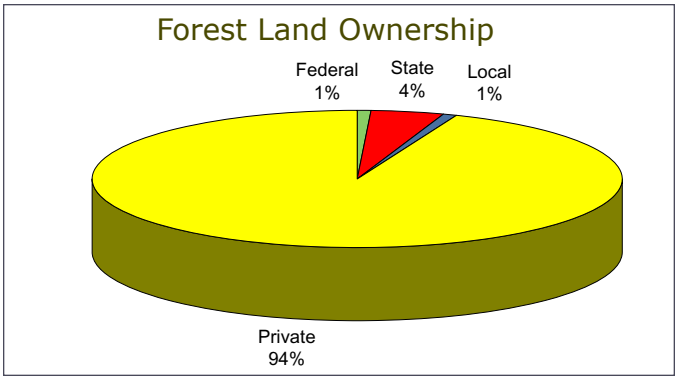
2009 Forest Health highlights

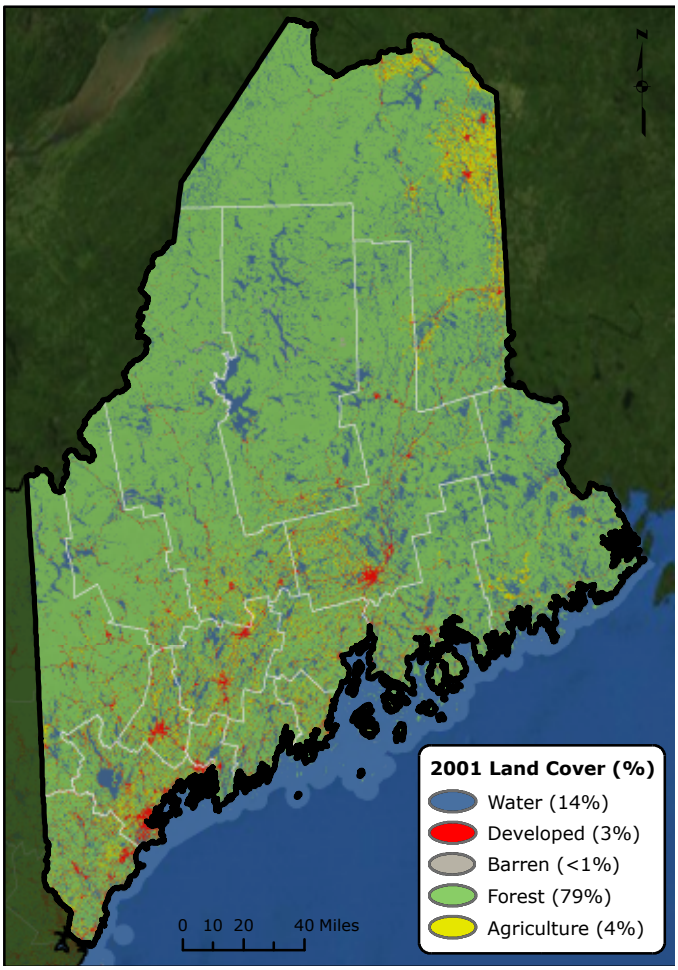
MAINE

Forest Resource Summary

Almost all of the forest lands in Maine are privately owned—approximately 94 percent—with only 1 percent in Federal ownership that encompasses the eastern portion of the White Mountain National Forest. The latest forest inventory in Maine estimates that 17.7 million acres are forested, which is 79 percent of the State (90 percent of the land base). The forest resource is made up of a variety of forest types, mostly spruce and balsam fir, maples, other hardwoods, and pine.

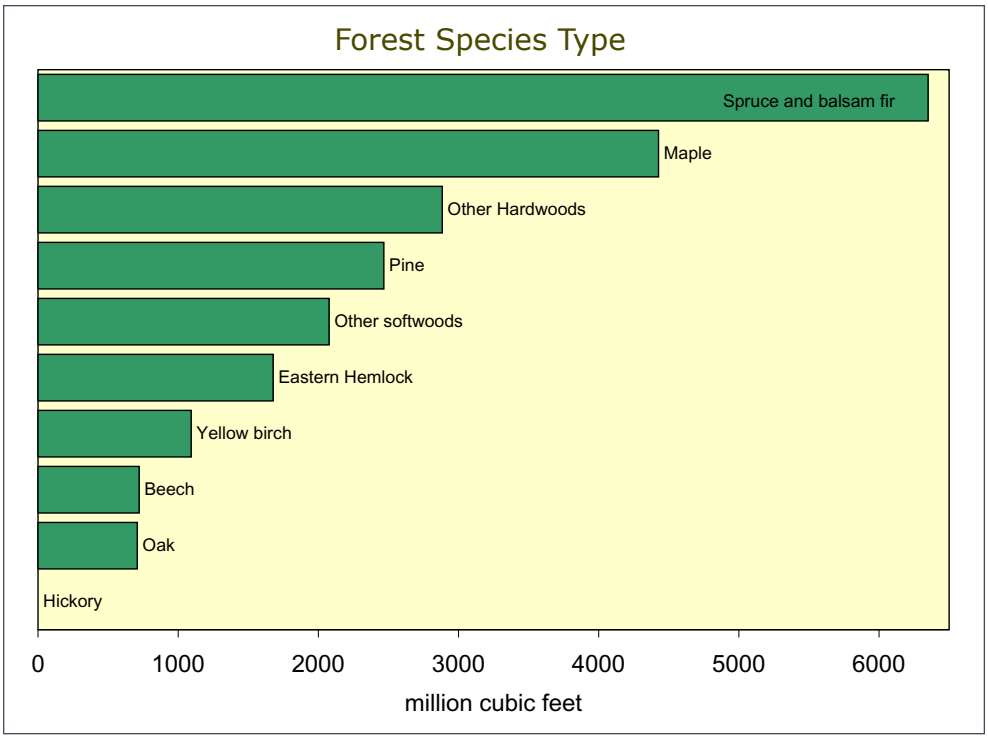
Maine's forests provide much of the raw materials to fuel the State's mills and serve as the backdrop for the recreation industry. These forest-based industries employ more than 12 percent of Maine's workforce and generate more than 11 percent of the State's payroll. The overall annual contribution of the forest resource to Maine's economy exceeds $8.5 billion. The forests of the State also provide watershed, environmental, wildlife, and recreational benefits. Forested parks and individual shade trees provide similar amenities in urban and suburban settings.





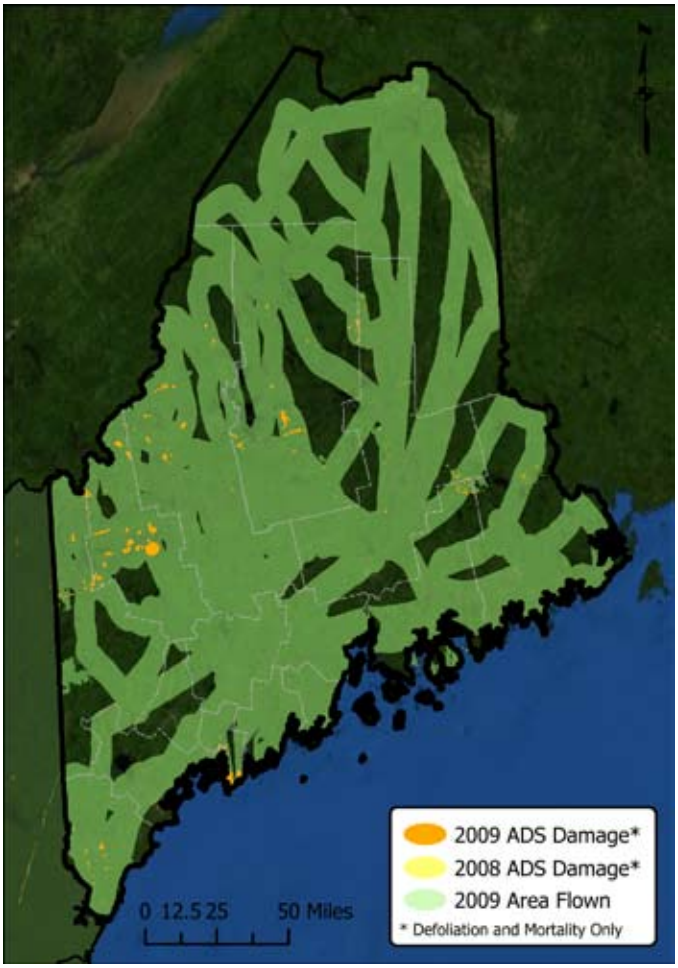
Forest Health Programs in the Northeast

State forestry agencies work in partnership with the U.S. Forest Service to monitor forest conditions and trends in their State and respond to pest outbreaks to protect the forest resource.



Aerial Surveys

In Maine, 67,851 acres of damage were reported. The major type of tree damage observed from the air was 50,837 acres of discoloration caused by Anthracnose leaf disease and 9,280 acres of discoloration attributed to needlecast disease. Another significant type of damage was 3,587 acres of mortality and discoloration caused by flooding and high water. In December 2008, the severe ice storm resulted in 2,478 acres of trees with branch breakage or broken main stems.



This map delineates aerial detection survey (ADS) results for Maine in 2008 and 2009.

Forest Damage

Firewood and the Movement of Invasive Pests: This year a major focus was training and outreach on the issue of how firewood movement spreads invasive pests. The Maine Forest Service partnered with the Maine Department of Agriculture on invasive insect outreach, focusing in particular on the Asian longhorned beetle and emerald ash borer. Similar activities occurred in the other States across the Northeast.

Tens of thousands of pieces of literature were handed out over the past year. As much "face time" as possible was put into the effort this year because this had a greater impact on people than using passive displays to communicate this message. Wallet cards, bookmarks, posters, fliers, and factsheets were put up or distributed in town offices, convenience stores, libraries, and at trail heads and other venues. The "Leave Your Firewood at Home" and/or "Be on the Lookout for Invasive Insects" messages were promoted at fairs, festivals, camper shows, outdoor shows, and other gatherings. Personal contact was made with campground owners to impress on them the importance of campers not moving firewood, and campground presentations were made during the summer to communicate directly with campers.

Media coverage included a public service announcement broadcast on TV stations and the Internet across the State and beyond; a news release covering invasive insects and firewood movement, which started in early spring and continued throughout the summer; Web sites on firewood and/or invasive insect threats in Maine; and articles in various publications. Groups that have an outdoor connection were asked to use their Web sites to promote the "leave your firewood at home" message. A game demonstrating the spread of invasive pests through firewood movement was developed, and beetle costumes were made that proved to be effective as outreach tools.

Maine Forest Service interns model Asian longhorned beetle and emerald ash borer costumes developed by summer interns.

Forty-four high-risk campgrounds were surveyed for Asian longhorned beetle and emerald ash borer, and purple traps for the emerald ash borer were set out in 13 campgrounds or high-risk sites. Various surveys for invasive bark beetles, wood borers, and pine pests were made across the State. These invasive insects were not found.

Hemlock Woolly Adelgid Management: A Regional Effort: Maine, New Hampshire, and Vermont have similar challenges and advantages in managing hemlock woolly adelgid. In July 2009, the three States were awarded a U.S. Forest Service Redesign Grant to develop a coordinated program to slow the spread of hemlock woolly adelgid in northern New England. Since the notice of the grant award, these States have developed unified survey and reporting standards, and have taken steps toward aligning quarantines, developing impact assessment plots, and creating a georeferenced database of information about adelgid presence and management. We will work with researchers outside our organizations to look into new management strategies—our existing partnerships will help facilitate outside research and sharing of ideas. Work done with this grant will demonstrate a replicable, regionwide approach to forest protection by adapting available tools to northern conditions. This work can also serve as a model for other regions that may soon face this invasive pest.

Entomology technician Wayne Searles samples for predator beetles released for hemlock woolly adelgid biological control. Both species of predator beetle released in Maine (*Sasajiscymnus tsugae* and *Laricobius nigrinus*) have successfully reproduced—an important step toward becoming effective management tools.

Hemlock Woolly Adelgid Biological Control in Maine: Scattered forest infestations of hemlock woolly adelgid have been found in seven southern and coastal York County towns. Management efforts in the forest are focused on developing a cadre of biological control agents. Promising developments on this front in 2009 included the recovery of one of the agents, *Laricobius nigrinus*, for the first time in Maine and recovery of almost 30 *Sasajiscymnus tsugae*, the other agent released in Maine, from sampling on two trees. These recoveries are especially encouraging following the cold weather in January 2009.

Elongate Hemlock Scale (*Fiorinia externa*): In August and September 2009, elongate hemlock scale was detected on established ornamental hemlocks by homeowners at two residences in southern Maine. This pest is a significant concern because it is an important factor leading to widespread hemlock mortality in southern New England, and it is a serious economic pest of Christmas trees. This is the first detection of established EHS populations in Maine—previously it had been found during nursery inspections. The detection in Maine was particularly troublesome because it was located in the same neighborhood as an established hemlock woolly adelgid infestation. The detections were in Kennebunk and Kennebunkport, which are part of a hemlock-rich area in Maine.

Workshop attended by State and private plant health professionals to become familiar with the characteristics of elongate hemlock scale.

The Maine Forest Service response to elongate hemlock scale detection has included measures to contain its spread and to reduce populations of hemlock woolly adelgid in the surrounding area. In addition, outreach to the public and local green industry professionals has been focused on raising awareness of this insect. Future management activities will include additional physical and chemical controls, monitoring, survey, and outreach.

Biosurveillance for Emerald Ash Borer: This year, Maine was the first State ever to conduct a wide-scale biosurveillance program to monitor for emerald ash borer. At 18 sites throughout southern and central Maine, local volunteers were assigned to survey colonies of *Cerceris fumipennis*, a native nonstinging buprestid wasp that hunts metallic wood borers. Approximately 500 buprestids were collected. Purple traps at 13 locations were also employed to monitor the borer. Emerald ash borer was not detected in the State by either method.

Volunteers learn to use a native wasp to monitor for emerald ash borer.

Other Insect Pests: Native and established insect populations, with a few exceptions, were at low levels this growing season. A notable exception was **browntail moth**, which caused heavy defoliation in Bath, West Bath, Brunswick, and Topsham at the southern terminus of Merry Meeting Bay. Heavy infestations are ongoing on one island each off of Freeport and Kennebunkport. Total defoliation covered 758 acres; however, population levels sufficient to cause human discomfort due to rash were more widespread.

Browntail moth on tree limbs.

Anthracnose Diseases of Hardwoods: The excessively wet spring and summer seasons led to the development of numerous leaf diseases on hardwoods. Anthracnose diseases were

widespread, and caused some moderate and localized serious damage, especially in mid- and south-coastal communities in 2009. **Oak and maple anthracnose** caused some limited damage to leaves of their respective hosts in the central and southern regions. Some moderate to heavy damage to paper birch from **birch anthracnose** (*Septoria betulae*) occurred in the northwestern region of Maine, especially in the higher elevations where the crowns of birches showed browning and premature leaf fall. However, the most noticeable anthracnose damage was observed on ashes that resulted from infection by *Gnomoniella fraxini*. While widespread throughout central and southern Maine, ash anthracnose caused moderate damage only in near-coastal locations, where damage was sometimes compounded by **ash leaf rust**.

***Dothiorella* Wilt of American Elm:** An unusual disease occurrence was reported on American elm in York County. Numerous American elms in Kennebunkport have been seen exhibiting slow dieback and decline symptoms for several years. The trees were first thought to be affected with **Dutch elm disease**, known to occur commonly throughout the region. However, culturing and isolation attempts determined that the pathogen was *Dothiorella ulmi*. This pathogen, which also causes a wilt of American elms, is sometimes referred to as **native elm wilt** or elm dieback, but is much less aggressive than **Dutch elm disease**. Symptoms are very similar to those of **Dutch elm disease**. The distribution of *Dothiorella* wilt in Maine is unknown, but is likely widespread, and may result in the occasional misdiagnosis of declining elms in other communities.

Fir Needle Casts: Several **needle cast diseases** (*Lirula* spp., most commonly *L. nervata*; and *Rhizosphaera pini*) of balsam fir were common in forest areas and in Christmas tree plantations throughout the State. These diseases are a particular problem for the Christmas tree industry, but cause little long-term damage to other trees. Again, the excessively wet weather during the growing season was instrumental in the development of these diseases.

***Sirococcus* Tip Blight of Conifers:** Several tip blights of conifers were found causing elevated damage levels in 2009. **Shoot tip blight** caused by *Sirococcus conigenus* appears to be an increasingly important threat, especially to hard pines in Maine forests. Moderate to heavy infection of red pine in natural stands was observed in central and Downeast regions of Maine. Damage in all areas appears to have increased slowly but steadily for the past several years.

Sirococcus on red pine.

Sirococcus tsugae was recently confirmed on eastern hemlock in Maine, based on DNA sequencing. This is the first report of this pathogen on eastern hemlock in the United States. Damage from this disease on hemlock has been observed in the State since 2006. The tip blight apparently affects only the distal-most tips of branches, seldom killing more than 0.5 inch of shoot tip growth. Infection has been observed only on current-season shoot tips, so primary infection is believed to occur early in spring, probably within days after new shoot growth is initiated. The disease is common in understory advance regeneration of hemlocks in natural stands, particularly in York, Cumberland, and Oxford Counties. A more formal distribution survey will be conducted in the near future.

Sirococcus on hemlock.

Tar Leaf Spot of Norway Maple:
Tar leaf spot (*Rhytisma acerinum*) of Norway maples caused severe leaf infections, leaf browning and curling by mid-summer, and premature leaf drop this year in affected trees wherever host trees occurred. The epidemic was very noticeable to the public, and prompted the most inquiries of all the tree disease questions asked of the State tree diagnostic lab this season. The wet April and the excessively wet June and July clearly favored development of this disease. Street trees and ornamental Norway maples in most of the larger towns in the State all experienced significant leaf damage from this disease. A trace amount of tree refoliation did occur during late August and September. This disease is not expected to have been enough to cause any significant damage. However, some branch dieback may be visible next spring on some individual trees.

Tar leaf spot on maple leaf.

White Pine Needle Cast:
After a brief respite from infection levels of this pathogen in 2008, this disease returned to a high incidence level in 2009. **White pine needle cast** (*Canavirgella banfieldii*) was especially prevalent in the western counties of Oxford, Franklin, and Somerset, but occurred throughout central, southern, and eastern regions as well.

White pine Canavirgella needle cast and close-up.

Crowns of many affected trees appear quite thin as a consequence of losing all but the current-season needles. Initially, this disease was thought to be of little long-term consequence because environmental conditions that promote high infection levels rarely occur in sequential years. However, conditions have been highly favorable for disease development now for at least 4 consecutive years.

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